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## Corporate Board winners announced

by Larine Barr, AFRL Public Affairs

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — The Air Force Research Laboratory recognized its top performers July 11 during the third annual AFRL Corporate awards luncheon at Wright State University's Ervin J. Nutter Center.

This year's winners were selected from among 99 nominations submitted from all AFRL directorates. Finalists and winners were chosen by the AFRL corporate award selection board and approved by AFRL Commander Maj. Gen. Paul D. Nielsen.

"In reviewing the nominations, I was struck by the extraordinary breadth and depth of our work and the impressive quality, innovation, and dedication of our people. It's almost unfair to single out a single winner in each category—all of the nominations were so strong. Our winners should be proud not only of their own work, but also to represent the outstanding quality of AFRL's men and women," General Nielsen said during the banquet.

Both team and individual awards were presented during the ceremony. This year's Commander's Cup individual award went to Sandra Fries-Carr, Propulsion Directorate at Wright-Patterson Air Force Base; and Dr. Morley Stone, Materials and Manufacturing Directorate, Wright-Patterson Air Force Base. Fries-Carr, an electrical engineer, is recognized for her leadership in establishing AFRL as a worldwide "one-stop-shop" for advanced capacitor technology transfer. Stone, a research biologist, is credited for advancing the directorate's biotechnology program. The Commander's Cup team award went to the Laser Tracking Experiment Team, Directed Energy Directorate at Kirtland, N.M., and the Wireless Information Assurance Team, Information Directorate at Rome, N.Y. The Laser Tracking Experiment Team is part of the Starfire Optical Range Division, which operates one of the largest telescopes in the world capable of imaging near-Earth-orbiting satellites. The division conducts research into technologies that will improve the quality of images received. The Wireless Information Assurance Team crafted a plan to secure wireless local area networks at the Rome Research Site.

Mark Wunderlich, AFRL's Sensors Directorate at Wright-Patterson Air Force Base, garnered the Scientific/Technical Management award for leading a successful technology demonstration of advanced infrared countermeasures for protection of large aircraft. The Scientific/Technical Achievement Award was presented to Paul Barnes, Propulsion Directorate here for significant advances in high temperature superconductivity conductors essential to Directed Energy weapons. The Pulse Detonation Engine Team, headed up by Frederick Schauer and Jeffrey Stutrud, Propulsion Directorate,



AFRL Commander's Cup individual award winners - Sandra Fries-Carr and Dr. Morley Stone

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<http://extra.afrl.af.mil/news/index.htm>

## Wright scholars start work

by Susan M. Barone, ASC Public Affairs

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — Top-notch high school sophomores, juniors and seniors started their summer jobs this week as research assistants at the Air Force Research Laboratory.

The 27 students were selected from 129 local and out-of-state applicants received by AFRL's Propulsion Directorate in February to participate in the Wright Scholar research assistant pilot program.

"It was a blind review," said program coordinator John Horner. "We had no idea who these students were, what their background was, what high school they were from, or what affiliations they might have. The review was based on scoring criteria. We gave the student's GPA, for instance, a rank of one through five. We ranked their community service and extracurricular activities as well."

The committee looked for well-rounded people, not just the highest academic achievers, he said. For the pilot program, the directorate accepted students in grades 10 through 12 who qualified. Of the 27 students who were chosen, 19 high schools were represented. Next year, the directorate will accept only 11<sup>th</sup> graders, who will then stay with them for two summers.

"We had 20 from the 10<sup>th</sup> grade who applied, 96 from 11<sup>th</sup> grade and 13 from the 12<sup>th</sup> grade," said program administrator Rebecca Oriakhi. "We selected six 10<sup>th</sup> graders, 16 from 11<sup>th</sup> grade and five from the 12<sup>th</sup> grade."

"Students will assist in primarily in-house, on site research and apply their knowledge of chemistry, physics, and mathematics as used in various types of engineering careers," said Horner.

They also will participate in a jet engine propulsion short course, taught at the Air Force Institute of Technology, and attend weekly lectures with experts who will discuss propulsion and power technologies, such as the pulse detonation engine, scramjets, optics and lasers, combustion, rockets and plasma research.

When program coordinators shared with other directorates the overwhelming response they received, AFRL's Air Vehicles and Human Effectiveness directorates indicated an interest in participating. As a result, four students will work at the Air Vehicles Directorate, and one student will work at the Human Effectiveness Directorate. @

**Find additional Features on the web**

**Base volunteers prepare for career paths**

**Nonstructural Materials experts evaluate lubrication**

**Stearns helps Air Force, military win soccer titles**

# Munitions Directorate initiates Campus Challenge

by Rex Swenson, Munitions Directorate

*EGLIN AIR FORCE BASE, Fla.* — Three years ago, the Air Force Research Laboratory's Munitions Directorate initiated the Revolutionary Technology (Rev Tech) program with the potential to create new airframe/ordnance and guidance/control paradigm shifts in technology.

The directorate dedicated a portion of its applied research budget to pursue high-risk, high-payoff revolutionary munitions related technologies. The principal goal of the program is to discover and foster technologies that may lead to the development of highly innovative solutions to defeat a variety of targets, including fixed and moving targets, hard and soft targets, and above ground and deeply buried targets.

According to Rev Tech program manager, Charles Cottrell, ideas and concepts representing new approaches are sought to defeat these different types of targets.

"One of the ways that the Rev Tech program seeks to discover and foster the development of innovative solutions is by involving students from universities all across America through a Rev Tech spin-off effort known as Campus Challenge," said Cottrell.

The first ever Campus Challenge problem solving competition invitational workshop meeting was held recently at the University of Florida Graduate Engineering and Research Center (GERC) in Shalimar, Fla. Representatives from 10 different universities met with Air Force representatives to go over the ground rules of the competition and learn more about the first challenge – defeating deeply buried targets.

"The objective of this first Campus Challenge effort is to derive one or more innovative methods to neutralize the operation of a well-defended, hardened/deeply buried facility located within an unfriendly country," explained Cottrell.

Munitions Directorate Chief Scientist Dr. Bob Sierakowski co-hosted the meeting with Cottrell and Dr. P.M. Sforza, director of the GERC. Other guest speakers included Bruce Patterson, who gave an overview of target characteristics, Dr. Tom Eastler, who briefed on target geology, Dan Brubaker and Dr. Al Ohrt talked about the different levels of functional defeat, and Brenda Solar ended the day with a briefing on contracting with the Air Force.

Universities chosen to participate in this first competition were Cornell, Georgia Tech, North Carolina A&T, Texas A&M, Arizona, Delaware, Maryland, Missouri (Columbia), Missouri (Rolla) and the University of Scranton.

Upon opening the meeting, Sierakowski explained to the group that, "the purpose of the competition is to solicit innovative, potentially paradigm-shifting ideas that have the potential, upon maturity, to successfully address specific real-world problems of interest to the Air Force research community. This direct competition method is," according to Sierakowski, "the spirit of the American way."

A commerce business daily broad area announcement was used to solicit competitors for this first Campus Challenge, which is broken down into two phases, explained Cottrell.

"The first phase is a white paper competition and a follow-on proposal competition. The objectives of the competition's first phase is to examine the problem presented by deeply buried targets and offer an innovative solution to that problem in the form of a submitted white paper," he explained. "The white papers can propose the use of emerging technologies, the innovative application of off-the-shelf technologies, or a combination of both," said Cottrell.

Once the papers are submitted in December, representatives from the Munitions Directorate will evaluate and select two of them for further (Phase II) competition.

According to Cottrell, the two universities that submit a winning white paper will each receive a Phase II \$150,000 grant. At the discretion of those institutions, use of the grants will "flesh out" their respective white papers and create well-structured development and transition proposals.

These Phase II proposals will, as a minimum, consist of a detailed technology roadmap, a detailed development and transition schedule, and a detailed cost estimate. The purpose of these Phase II proposals is to provide the Munitions Directorate with a comprehensive strategy, whereby the least amount of Air Force dollars can be best invested to mature the relevant technologies for advanced development. @

## Corporate Awards (from page 1)

earned the Scientific/Technical Achievement Team award for breakthroughs in fielding low cost, pulse detonation engines.

The Senior Leadership Award went to Col. Gerald Hasen, Plans and Programs Directorate for developing a new Air Force instruction aimed at improving the technology transition process. Maj. Terence Andre, Human Effectiveness Directorate, was credited with the Leadership Award for his outstanding guidance as chief of the Warfighter Skill Development and Training Branch.

Grazia Royalty, a management analyst with the Human Effectiveness Directorate was presented the Mission Support Award for her actions as focal point for AFRL's research sites. The Public Affairs Office, Directed Energy Directorate at Kirtland, N. M., garnered the Mission Support Team award for increasing visibility of the Airborne Laser and other technologies. Team members include Rich Garcia, Conrad Dzielwski, Kenneth Englade, Judy Johnston and Eva Hendren.

Mary Jane Hendrickson, a legal technician with the Information Directorate, Rome, N.Y., earned the Senior Administrative Excellence Award. She is recognized for designing and updating webpages and computer databases. Senior Airman Kristina Brown, Human Effectiveness Directorate, Brooks Air Force Base, Texas, garnered the Administrative Excellence Award for major contributions to the Automated Business Service System Program and support to three geographically separated duty locations. @

# AFRL's DE funding High Energy Laser fighter simulator

by *Deborah Mercurio, Directed Energy Directorate*

**KIRTLAND AIR FORCE BASE, N.M.** — Playing computer games may not be detrimental to your child's well being after all. The coordination skills acquired may be the basics needed for a career in fighter aviation.

The Air Force Research Laboratory's Directed Energy Directorate at Kirtland Air Force Base, is currently funding and developing a High Energy Laser (HEL) fighter simulator, a highly sophisticated computer game, in conjunction with the Theater Aerospace Command and Control Simulation Facility (TACCSF).

The HEL Fighter is an F-16 simulator platform modified to integrate a high-energy laser weapon model into an F-16's program. Lockheed Martin, the TACCSF subcontractor performing the model development, is currently investigating the use of the HEL on the Joint Strike Fighter. The 150<sup>th</sup> New Mexico Air National Guard Wing, "the Taco Air Force," actively participates in the simulator development by providing feedback. The pilots' comments and suggestions on a variety of issues facing this new weapon system are integrated into the development.

The HEL Fighter Simulator, on an F-16 simulator platform, is located in the Theater Aerospace Command and Control Simulation Facility. An operator can simulate aiming and firing a laser against airborne targets while flying the aircraft.

One model is capable of air-to-air engagements; the other model encompasses air-to-ground target engagements. The realistic models include atmospheric transmission losses, target lethality engagement parameters and laser system limits and ranges. The simulator evaluates design parameters for an actual high-energy laser weapon system, and assists an operator to get familiar with a directed energy weapon system. The system can be used to develop tactics and a concept of operation.

"It is imperative to have a better understanding of what lasers can do for our fighter pilots," said Col Mark D. Stephen, Deputy Director of the Directed Energy Directorate. "By providing the warfighter with the best technology, we ensure the protection of the flyer and better defense for our national interests."

Recently, the colonel was provided an opportunity to get a real world fighter pilot's perspective. Rudy Martinez, strategic planner for the Directed Energy Directorate, arranged an aircrew flight physical, altitude chamber training, and egress training on the F-16 for the colonel, so that he could have an orientation flight with the "Taco Air Force."

According to Martinez, the colonel's aircraft was part of a red force, two-ship formation. They did a training ingress in the Military Operating Area at White Sands Missile Range, and engaged a blue force, four-ship for air-to-air combat. Zeroing in, Stephen's F-16 destroyed a ground target with a Laser Guided Bomb. The colonel was able to experience first hand the capability and mission workload of the aircraft and realized the training required of an Air Force fighter pilot.

Ultimately, the goal is to participate in war games to determine the utility of using a high-energy laser, an advanced weapon system, against conventional warfare weapons. The HEL fighter simulator is scheduled for completion this year to be used in Air Force war-gaming for system evaluation. @

## Warfighter Training Division chief, Col. Straw retires

by *2nd Lt. J. Elaine Hunnicutt, AFRL Public Affairs*

**MESA, Ariz.** — Col. Jerald "Jerry" Straw, Air Force Research Laboratory Warfighting Training Research Division chief, retired June 28 from active duty. He has served his country as an Air Force member for 37 years, both in the Air National Guard and active duty.

He earned his commission from Officer Training School in April 1973, as an honor graduate, and has continued that level of excellence throughout his career.

Straw left new troops with food for thought. "I think the best advice I could give anyone would be two rules I learned as a child from my parents, and what I think the Air Force's Core Values can be boiled down to. Always do your absolute best, no matter what the task, whether snack bar officer, pilot or chief of staff; and always treat others (including your service and country) the way you would want to be treated."

Most currently having directed research and development for the warfighters out of Mesa, Ariz. he ended his long career in the same state he grew up in and went to college. He graduated from the University of Arizona in 1972, earning a bachelor's degree in biology.

As the commander at his most recent assignment, he oversaw the process of "ensuring optimum solutions for real-world training requirements" and manages a \$38 million budget while guiding a staff of more than 180 military, government civilian and contractor employees.

During his career, he served as an operational weapons system

instructor, lead-in fighter training flight instructor, executive officer, squadron commander, assistant professor and course director at the Air Force Academy, chief of fighter programs at USAFE, chief of bases and units at Space Command, and Deputy Director of Plans and Programs at USAFE.

Straw ended his career with an assignment that has a direct impact on the warfighter. "The best thing about the lab is being part of a world-class team that is truly transforming the way the Air Force and the other services are doing training and will do training in the future," Straw said.

"It has been demonstrated repeatedly, that in warfare ... training is key," as he referenced the Navy kill ratios in Vietnam and how they improved from 2 to 1, to 12 to 1 when 'Top Gun' training was instituted.

"I believe the ultimate realization of Distributed Mission Training (linked multi-ship simulators that provide a Red Flag training scenario in cyberspace), invented and currently being expanded by HEA, will have a similar transformational impact on combat capability," Straw said.

Straw reminded his troops to keep up the "great world-class" work they are doing. "Continually identify what the training future can be and then create it, and always remember the vision—provide the world's best training tools, ensuring warfighters have the skills to win." @



# Program produces 'out-of-this-world' learning for students

by Timothy R. Anderl, Materials and Manufacturing Directorate

WRIGHT-PATTERSON AIR FORCE BASE, Ohio — A school "residency" program, designed by an optics expert from the Air Force Research Laboratory's Materials and Manufacturing Directorate (ML) and a member of the Yellow Springs Community, led to 20 elementary school students designing a laser-based audio transmitter that traveled to space as part of a National Aeronautics and Space Administration program.

The program that led to student participation in the NASA Space Experiment Module (SEM) project was initiated by Dan Rudolf, a community member from Yellow Springs, Ohio, when he approached Dr. James Grote, an optics researcher from ML's Sensor Materials Branch, with his idea of a residency program.

In the past, scientists and engineers have held basic "attention-getting" demonstrations at local schools. However, these demonstrations are typically limited to an hour in length and provide little depth into basic understanding of scientific principles. The residency program would bring an experienced scientist or engineer into the classroom to teach the basics of his or her field, and to demonstrate concepts that students could apply to a project.

"I agreed to be the first scientist-in-residence for the program, and began teaching the fifth and sixth grade students at Mills Lawn Elementary School in Yellow Springs about light and lasers," Grote said. The laser residency was presented in three, 60 to 90 minute sessions, which included hands-on experiments for the students. The sessions were held every other day to provide the elementary school teacher time to help students with additional questions and to prepare them for the next lecture.

"Because I was working with elementary school students, the basics had to be presented conceptually and with very little math," Grote said. "This is the approach I used to teach the students what light is, why they are able to see it, the color and speed of light, refraction of light through various mediums, and about lasers and how they work. I also taught a little geometrical optics using concave and convex lenses and mirrors to demonstrate what laser light does when it encounters them."

Students performed many hands-on experiments to physically demonstrate the concepts they were learning. Laser-based equipment, such as a laser scanner, leveler and micrometer were also demonstrated.

When the week of lectures was complete, students wrote a paragraph detailing what they'd learned. Based on their essays and individual enthusiasm, a core group of 20 students were chosen by their teachers to work on a laser-based project. The project, which lasted a week or so, was to find a way of transmitting the output from the school's public address system to the school superintendent's office, 300 feet away and on the other side of the street.

After coming up with various options, like using walkie-talkies, wireless speakers, cell phones, intercom systems, and laser methods they'd learned during the lecture and demonstrations, the students met with the school principal and superintendent to propose the project. Students received a budget, researched the specifications and cost for each option, the procedures for getting permits, and even met with the village manager to estimate the cost of digging a trench across the street for installing electrical or fiber optic cable. The students decided that a free space laser-based audio transmitter would provide acceptable performance and would be the most cost-effective choice.

"Myself and a group of adult volunteers worked with the students to build and install the system. The students even simulated rain and snow to test the integrity of the transmitted signal," Grote said. "They were very excited to see their project work for the first time. When the



Dr. James Grote and students from Mills Lawn Elementary School weigh and package a laser module for the Materials on the International in Space Station Experiment (MISSE). The experiments are going up on NASA mission STS-112 in August 2002. The experiments will be attached to the space station for three years to study effects of the space environment on lasers.

project was complete, the students who comprised the core group presented what they had learned during the laser project to the rest of the school, their parents and members of the community."

During his second laser residency, Grote asked students to find applications for the laser-based audio transmitter. When space communications was suggested as an application, Grote, the teachers and students wrote a proposal for a passive experiment for the SEM program. The students developed and proposed their project to NASA, which would test space effects on laser diodes.

The proposal was accepted by NASA, which was significant since their proposal was in competition with high schools and even colleges. It was the only elementary school on this SEM program. As part of the SEM program, they were invited to the Kennedy Space Center to see the space shuttle carrying their project launched. The students characterized the wavelength and power of a laser diode at Wright Patterson Air Force Base before the launch, and since its return from space, the students have started re-characterizing the laser.

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# Net Index

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Due to the number of submissions we receive, some sections of *news@afrl* are available exclusively on-line. The on-line version of the newsletter allows users to view the AFRL corporate calendar, news releases generated by AFRL headquarters, operating instructions, L@b L@urels and Roundups sections.

The L@b L@urels section of the electronic newsletter is dedicated to members of Air Force Research Laboratory who receive awards and honors. The Roundups section of the electronic newsletter keeps Air Force Research laboratory employees informed about contracts AFRL has awarded. Below is an index of articles one can find in each of these on-line sections.

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## L@b L@urels

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- Researcher honored by Ukraine National Academy of Sciences
- AFRL contractor receives Silver Snoopy
- Airborne Laser Team wins management award
- AFRL shares prestigious engineering award

***Check out our  
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to see the  
complete  
listing of  
Roundups***

***For more on these stories see news@afrl  
<http://extra.afrl.af.mil/news/index.htm>***

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## AFRL bids farewell to retiring information officer



WRIGHT-PATTERSON AIR FORCE BASE, Ohio – Maj. Gen. Paul D. Nielsen, Air Force Research Laboratory commander, presents Col. Bruce Thieman, on right, former AFRL corporate information officer, with a Legion of Merit Award during his retirement ceremony July 10 at the Air Force Institute of Technology. Thieman was born at Wright-Patterson Air Force Base in 1954; his father was a fuels expert at the base and because of that he spent his early years here. He served in the military for 26 years (Air Force photo).

To view the full text of these and other articles visit the *news@afrl* page on the Internet at <http://extra.afrl.af.mil/news/index.htm>.

To submit L@b L@urels or Roundups from your directorate, send a query to AFRL Public Affairs at:

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